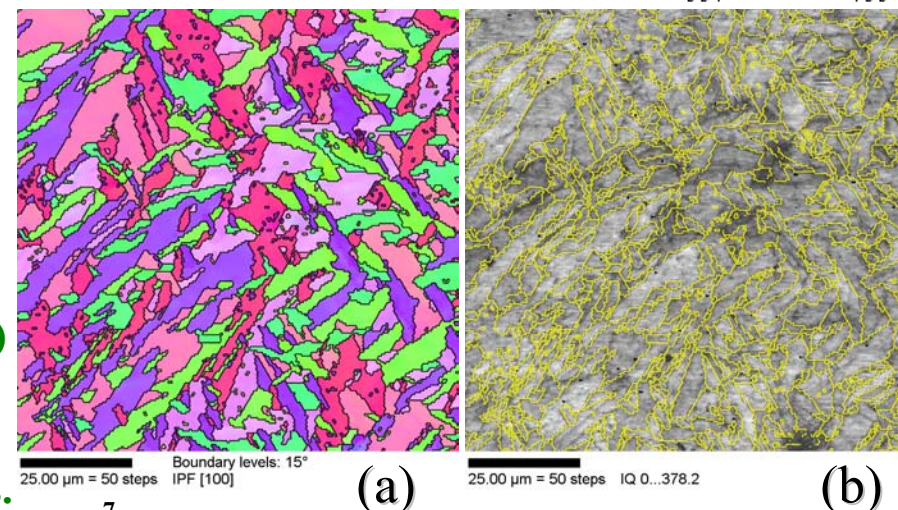
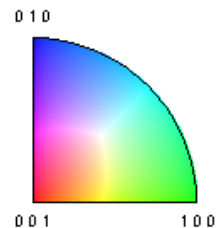


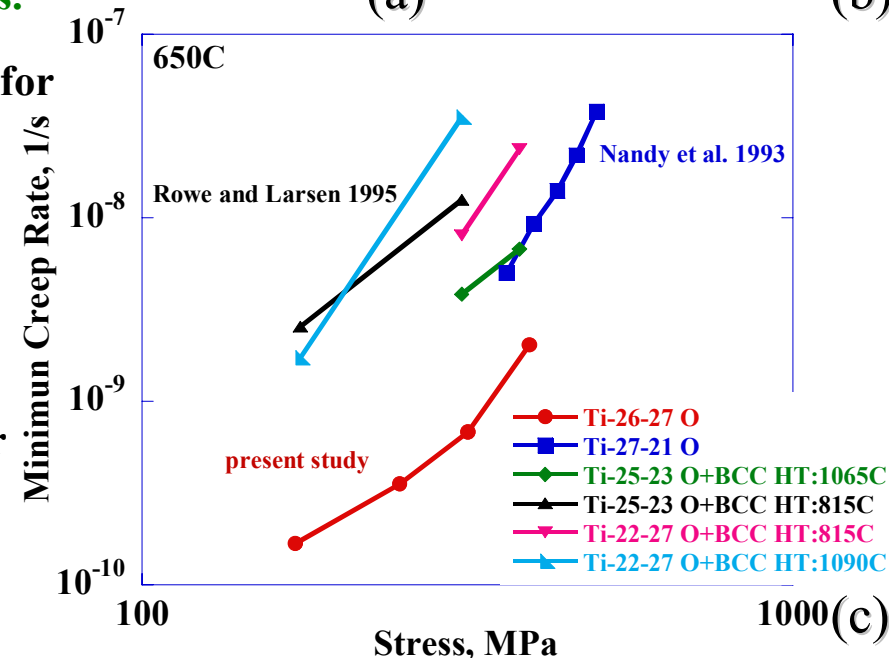
Grain Boundary Engineering of High Temperature Structural Alloys

Carl Boehlert, Alfred University, DMR-0134789

- Through controlled thermomechanical processing treatments, Grain Boundary Engineering of Ti-Al-Nb alloys can be achieved where the misorientation distributions at the grain boundaries can be altered through phase transformation. This can significantly influence the elevated-temperature creep deformation behavior.
- Results suggest manipulation of the Orthorhombic (O) phase boundaries may provide fertile ground for improving the High-Temperature Properties of Ti-Al-Nb microstructures containing O+BCC phase mixtures.



(a) A [100] normal-direction inverse pole figure map for a fully-lath O-phase Ti-26Al-27Nb microstructure where the colors represent the sample's normal direction indexed to the O unit quadrant. The image quality map in (b) indicates that the 69% of the boundaries could be described as being rotated about either $\langle 094 \rangle$ or $\langle 100 \rangle$ with a (221) twin plane. The implications of such boundaries on the creep behavior have yet to be established, however the creep rates of this microstructure were significantly lower than all other O-based Ti-Al-Nb alloys (c).



Scanning Electron Microscopy Education (SEMED) Outreach Program

Carl Boehlert, New York State College of Ceramics at Alfred University, DMR-0134789

Educational/Outreach Activity:

The goal of this program is to educate non-majors, high school students, and teachers about Materials Science and Engineering (MSE). The program is based on Scanning Electron Microscopy (SEM) education and involves hands-on instruction in use of a SEM. In its first two years, over 355 students have been taught by Alfred University volunteers, including faculty, staff, graduate and undergraduate students. Some of the students then return to the program to perform a project for their high school science classes on samples they have prepared.



Bolivar Richburg High School Science Students Performed Their 4th Quarter Research Project, titled “Life Beneath the Naked Eye”, through the SEMED Program at AU. Visit <http://semed.alfred.edu> for details and to see the students’ interesting posters.

Top: Technical Specialist, Mr. Ward Votava, gives an overview of the SEMs to a group of local students prior to their hands-on learning sessions. Bottom: Two students examine human hair at high magnification as assisted by junior ceramic engineering student, Mr. Daniel Burnett III.

